Correlates of unprotected sex in a sample of young club drug users

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OBJECTIVES: To assess the demographic characteristics, psychiatric symptoms, substance use patterns, and sexual risk behaviors in a sample of club drug users to identify factors associated with unprotected sex during the 12 months prior to the interview.

METHODS: This cross-sectional study employed the targeted sampling and ethnographic mapping approaches via face-to-face interviews conducted at bars and electronic music festivals using an adapted, semi-structured version of the Global Appraisal of Individual Needs questionnaire. The sample comprised 240 male and female young adults who had used ecstasy and/or LSD in the 90 days prior to the interview and who were not receiving treatment for alcohol or drug abuse.

RESULTS: Of the 240 subjects selected (mean age: 22.9±4.5 years), 57.9% were men; of the male subjects, 52.5% reported having had unprotected sex in the previous 12 months. Of the total sample, 63.33% reported having had unprotected sex. Multivariate regression analysis showed that anal sex (PR = 1.26; 95% confidence interval (CI): 1.044–1.543; $p = 0.017$) and the use of alcohol/drugs to make sex last longer (PR = 1.430; 95% CI: 1.181–1.732; $p < 0.001$) are associated with unprotected sex.

CONCLUSIONS: The implementation of intervention strategies aimed at reducing sexually risky behaviors should take into consideration the specific characteristics of drug users and should include the development of safer sex negotiation skills.

KEYWORDS: Drug Users; Unsafe Sex; Risk Behavior; Sexual Behavior.

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INTRODUCTION

Club drug use has dramatically increased over the last two decades in both developed and developing countries (1). This particular subgroup of psychoactive substances, typically associated with ''the club scene,'' is most commonly used by young (18 to 25 years old), predominantly heterosexual, sexually active polydrug users (2). However, over the past few years, the use of club drugs has expanded beyond the club scene, where it is still popular, and can now be found in different environments, such as on college campuses and at house parties.

This group of substances typically has multiple effects, including euphoria, dehydration, increased energy and sensitivity to interpersonal connectedness, greater sexual arousal, and increased cognitive impairment (3–5). The combination of impaired cognitive functioning, such as poor decision-making and diminished judgment, and increased sexual arousal is particularly problematic, as it induces sexual risk behaviors (6–11). Specifically, previous studies have highlighted a higher prevalence of inconsistent condom use and multiple sexual partners among club drug users compared with the general population (12–14).

Recent epidemiological research has indicated that 64% of individuals infected with HIV have used an illicit drug (15,16). Despite the large number of studies reporting an association between drug use and sexual risk behaviors, only a few authors have specifically examined the association between such behaviors and club drug use; the first such article was published in 1986 (17). A recent meta-analysis conducted by Hittner and Schachne (18) showed that, between 1986 and 2011, only 14 studies assessed the association between ecstasy use and sexual risk behaviors; of these, 12 are American, one is Australian, and one is Chinese (18).

Given the increased incidence of and problems associated with ecstasy use (15), and considering the well-documented

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connection between substance use and sexual risk behaviors, the need has emerged to better understand the association between these two phenomena. In particular, the fact that most of the available studies have been conducted in the United States and Europe underscores the need to investigate the topic in developing countries.

South America has higher prevalence rates of engagement in anal sex compared with other regions. These findings become particularly relevant if we take into consideration the fact that Brazilians account for approximately one-third of all people living with HIV in Latin America as well as the fact that unsafe sex is responsible for approximately 50% of all cases of sexually transmitted HIV in Brazil (19,20). An online survey conducted in Brazil by Almeida et al. (21) to assess ecstasy use patterns and the associated harm showed a positive correlation between the degree of ecstasy use and risk behaviors in this population, especially between unsafe sex and polydrug use. According to data obtained from the Brazilian Ministry of Health (22), HIV infection is already considered an epidemic in southern Brazil; the number of people with HIV in the southernmost state capital, Porto Alegre, is twice as high as the national average. Some of the reasons suggested to explain this difference include a higher rate of drug use and engagement in unprotected sex (22). Thus, a better understanding of the factors determining such behaviors could aid in the development of more effective prevention strategies, with more significant outcomes.

The aim of this study was to identify the factors potentially associated with unprotected sex (demographic characteristics, psychiatric symptoms, substance use patterns, and sexual risk behaviors) over a 12-month period in a sample of young club drug users.

METHODS

Participants and methodological procedures

This study is part of a larger naturalistic project that recruited 240 club-goers from Porto Alegre, a state capital and large metropolitan area in southern Brazil. The participants were recruited from March to July 2010 using targeted sampling and ethnographic mapping. The research staff, in conjunction with ''key informants'' in the club scene, mapped the main nightclubs, rave parties, and parks where potential participants were known to congregate. These potential participants were approached by the project staff and invited to participate in the study. Initial face-to-face interviews lasting an average of 15 minutes were conducted *in loco* to assess inclusion criteria. Interviewees who met all criteria were invited to participate in a more detailed interview and other data collection procedures.

The field interviewers were trained with a particular emphasis on the elements of rapport, street drug slang, and confidentiality/privacy of the information obtained. At the end of the interview, the participants received a lunch voucher as compensation for their participation. The inclusion criteria were the use of ecstasy and/or LSD at least once in the 90 days prior to the interview and the lack of current treatment for drug or alcohol problems.

Interviewed club drug users who reported having had unprotected sex were compared with club drug users with no episodes of unprotected sex in the 12 months prior to the interview with respect to demographic characteristics, psychiatric symptoms, substance use patterns, and sexual risk behaviors. Unprotected sex was defined as at least one episode of sexual intercourse without the use of a protective device, oral barrier, or other barrier protection against infection or pregnancy. This study was approved by the University of Delaware Institutional Review Board and by the Research Ethics Committee of the Hospital de Clínicas de Porto Alegre. All participants signed an informed consent form prior to their inclusion in the study.

Instruments

To identify eligible participants, a brief screening form was developed based on previous studies conducted in the U.S. with similar populations (12,23). Subsequently, the primary data collection instrument (used for selected individuals) was a questionnaire that was based on an abbreviated version of the Global Appraisal of Individual Needs (GAIN) instrument (24). The original instrument has been used in both adolescents and adults in a variety of settings and has been the main clinical and research measure adopted in many NIDA-funded multicenter studies.

The original version of this instrument comprises eight sections covering specific information on 1) demographic characteristics, 2) substance use, 3) physical health, 4) risk behaviors, 5) mental health, 6) environment, 7) legal aspects, and 8) vocational aspects. The adapted instrument used in this study focused on 1) substance use, 2) mental health, 3) risk behaviors, and 4) vocational aspects. In the sections covering mental health and substance use, the data were collected based on symptoms that are described in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). The basic demographic data included age, gender, education, and monthly individual income. The risk behavior and mental health questions were dichotomous and covered the periods of both 90 days and 12 months prior to the interview.

Substance use was assessed by asking participants how many times a particular substance was used during the 90 days prior to the interview and also during their lifetime. Substances included a comprehensive list of both illicit and prescription drugs.

Psychiatric symptoms were assessed using the mental health section of the questionnaire, comprised of three subscales focusing on anxiety, depression, and traumatic distress. Depressive symptoms were assessed using the nine items of the Depressive Symptom Scale (DSS) (e.g., ''During the past 12 months, have you had significant problems with feeling very trapped, lonely, sad, blue, depressed, or hopeless about the future?''). Anxiety symptoms were assessed using the 12 items of the Anxiety/Fear Symptom Scale (AFSS) (e.g., ''During the past 12 months, have you had significant problems feeling very anxious, nervous, tense, scared, panicked or like something bad was going to happen?''). Finally, traumatic distress was assessed using the 13 items of the Traumatic Distress Scale (TDS) (e.g., ''Sometimes you used alcohol or other drugs to help yourself sleep or forget about things that happened in the past.''). All of the items in the psychiatric symptom scale were dichotomous (yes/no questions). The total scores obtained in each of the subscales were added to obtain a final score.

Data analysis

Categorical variables are expressed as absolute and relative frequencies, and quantitative variables are expressed as the

means and standard deviation or as the medians and interquartile ranges (first and third quartiles). Psychiatric symptoms (depression, anxiety, and traumatic distress) were categorized as not significant, moderate, or clinically relevant according to the number of symptoms experienced in the 12 months prior to the interview. Non-significant depression was characterized as the presence of 0–1 symptom, moderate depression as 2–5 symptoms, and clinically relevant depression as >6 depression symptoms. The categories of anxiety were as follows: not significant, 0–1 symptom; moderate, 2–6 symptoms; and clinically relevant, 7–12 symptoms. Non-significant traumatic distress was defined as the absence of symptoms in the 12 months prior to the interview, moderate distress as the presence of 1–4 symptoms, and clinically relevant distress as 5–13 symptoms over a 12-month period.

The chi-square and t tests were used to analyze the subset of individuals reporting engagement in unprotected sex according to gender. Variables for which $p<0.05$ were considered significant.

A univariate Poisson regression analysis was used to identify the independent variables significantly associated with the study outcome. The variables exhibiting a *p*-value below 0.10 in the univariate model were considered appropriate for use in the multivariate model. Both models were adjusted for gender and sexual orientation (homosexual, bisexual, or heterosexual).

RESULTS

Demographic characteristics

Of the 240 subjects selected for inclusion in the study (mean age: 22.9 ± 4.5 years), 57.9% were male and 42% female. The subjects were all between 18 and 39 years of age. Sixty-nine percent of the subjects had completed high school, 42.1% were employed, and 60% had a mean monthly income of up to US$ 602.80 (US$ 1 = R$ 1.63 at the time of the study), which was approximately three times the monthly minimum wage in Brazil at the time of the study. Moreover, 63.33% of the participants reported having had unprotected sex in the 12 months prior to the interview (62.5% males and 37.5% females). The characteristics of this subset of subjects are described below. The majority of the participants were self-identified as heterosexual (71.3%), while 17.1% and 11.7% were self-identified as homosexual and bisexual, respectively. When comparing club drug users with and without a history of unprotected sex, no significant differences were found in their demographic characteristics (Table 1).

Psychiatric symptoms. In the 12 months prior to the interview, 50% and 18% of the participants reported moderate and clinically relevant depression, respectively. In the analysis of anxiety symptoms and traumatic distress, 58% of the participants were determined to have moderate anxiety, 47% had moderate traumatic distress, and 40% had clinically relevant distress.

Sexual risk behaviors. Sexual risk behaviors were assessed using several variables (Table 1). Of the 240 participants, 80% reported having used alcohol/drugs to make sex last longer, 63% reported having more than 2 sex partners, 40% reported having had anal sex in the past 12 months, and 15% had exchanged money for sex or sex for money (sex trading). Finally, 84% reported having had sex with a man who most likely had had sex with another man (MSM), and 2% reported having had sex with intravenous drug users.

Drug use. The drugs most frequently used in the participants' lifetimes in the overall sample were alcohol (99.6%) and marijuana (95.4%). LSD and ecstasy use was reported by 88.3% and 83.2% of the total sample, respectively, and 33.3% reported having used both ecstasy and LSD. In addition, 56.3% reported the use of inhalants, and 23.2% reported the use of amphetamines. The median number of days of use of any drug in the 90-day period assessed was 21 days (interquartile range: 12.56 to 32.37 days). Cocaine use was reported by over half of the participants (55%), 44% of whom had used the drug in the 90 days prior to the interview.

Unprotected sex according to gender. Of the 152 participants who reported engaging in unprotected sex, stratification by gender (62.5% males and 37.5% females) revealed that women had an overall lower education level ($p = 0.011$) and more severe symptoms of anxiety/fear ($p = 0.047$). Women also reported having had anal sex ($p = 0.048$) and sex while intoxicated ($p = 0.025$) less frequently than men.

Among the male participants, no significant association was observed between unprotected sex and any of the variables assessed.

Univariate analysis. Unprotected sex was regressed in a univariate model. Table 2 shows the prevalence ratios (PRs) and the respective 95% confidence intervals (95% CI) for the variables analyzed in the Poisson regression model. Of all the variables assessed, those with $p<0.10$ were considered to be candidates for inclusion in the multivariate model and included gender, anxiety/fear symptoms, having had anal sex, having exchanged sex for money or money for sex, number of sex partners, and having used alcohol/drugs to make sex last longer.

Multivariate analysis. Figure 1 shows that, of the variables included in the multivariate model, the following remained associated with unprotected sex: having had anal sex, having used alcohol/drugs to make sex last longer, and anxiety/fear symptoms. We observed that the variable under study was less prevalent in individuals with non-significant anxiety/fear symptoms compared with those with clinically relevant anxiety (reference category).

The percentage of subjects who engaged in unprotected sex and reported having had anal sex was 27% higher than that in subjects who did not report having had anal sex. Additionally, the prevalence of using alcohol or drugs to make sex last longer was 43% higher in the unprotected sex group. Conversely, subjects with non-significant anxiety symptoms were 28% less likely to have engaged in unprotected sex compared with subjects with clinically relevant symptoms. Both the univariate and multivariate analyses were adjusted for sexual orientation and gender.

DISCUSSION

In the present study, the subjects who had had anal intercourse and those who had used alcohol or drugs to make sex last longer used protection devices less often than participants who did not report these behaviors. No association was found between unprotected sex in the 12 months preceding the interview and gender, income, education, or occupation, which is consistent with a

Table 1 - Sample characteristics.

Variables	Unprotected sex		*p*-value
	Yes (n = 152)	No (n = 86)	
Age	23.24±4.61	22.58±4.28	0.286
Gender			
Female	57 (37.5)	42 (48.8)	0.117
Male	95 (62.5)	44 (51.2)	
Income			
No income	30 (19.7)	12 (14.0)	0.281
Up to US$ 602.80*	85 (55.9)	57 (66.3)	
More than US$ 602.80	37 (24.3)	17 (19.8)	
Occupation			
Student and employed	29 (19.1)	19 (22.1)	0.847
Student	48 (31.6)	28 (32.6)	
Employed	66 (43.4)	33 (38.4)	
Not a student and not employed	9 (5.9)	6 (7.0)	
Education level			
High school	32 (21.1)	25 (29.4)	0.347
Middle/junior high school	109 (71.7)	55 (64.7)	
Elementary school	11 (7.2)	5 (5.9)	
Sexual orientation			
Bisexual	18 (11.8)	10 (11.6)	0.954
Homosexual	27 (17.8)	14 (16.3)	
Heterosexual	107 (70.4)	62 (72.1)	
Depressive symptoms			
Not significant	42 (27.6)	34 (39.5)	0.166
Moderate	81 (53.3)	38 (44.2)	
Clinically relevant	29 (19.1)	14 (16.3)	
Anxiety/fear symptoms			
Not significant	45 (29.6)	36 (41.9)	0.079
Moderate	91 (59.9)	46 (53.5)	
Clinically relevant	16 (10.5)	4 (4.7)	
Traumatic distress			
Not significant	14 (9.3)	18 (20.9)	0.029
Moderate	72 (47.7)	40 (46.5)	
Clinically relevant	65 (43.0)	28 (32.6)	
Had sex with an IDU			
Yes	3 (2.0)	1 (1.2)	>0.999
No	149 (98)	85 (98.8)	
Had anal sex (insertive or receptive)			
Yes	69 (45.4)	25 (29.1)	0.019
No	83 (54.6)	61 (70.9)	
Ever exchanged sex for money			
Yes	12 (7.9)	3 (3.5)	0.286
No	140 (92.1)	83 (96.5)	
Had sex with MSM			
Yes	28 (18.4)	11 (12.8)	0.345
No	124 (81.6)	75 (87.2)	
Ever exchanged money for sex			
Yes	21 (13.8)	4 (4.7)	0.046
No	131 (86.2)	82 (95.3)	
Number of sex partners† (>2 *vs.* ≤2)			
Yes	103 (67.8)	48 (55.8)	0.089
No	49 (32.2)	38 (44.2)	
Used alcohol/drugs to make sex last longer			
Yes	32 (21.1)	5 (5.8)	0.003
No	120 (78.9)	81 (94.2)	

IDU = intravenous drug user; MSM = men who have sex with men.
*US$ 1 = R$ 1.63 at the time of the study.
†In the 12 months prior to the interview.

previous study conducted on ecstasy use in Brazil (21). Conversely, our sexual orientation results contradict the published literature; we did not observe significant differences in engagement in unprotected sex according to sexual orientation between the groups (25,26). We speculate that this difference results from the similar distribution of the three sexual orientation categories among the participants with and without a history of unprotected sex (low statistical power).

The association between anal intercourse and engagement in unprotected sex is consistent with the current literature, which suggests that participants who engage in unsafe sex are more likely to report other sexual risk behaviors, such as having multiple partners, exchanging sex for drugs/money,

Table 2 - Univariate analysis of candidate variables for inclusion in the multivariate model.

Variables	Univariate analysis		*p*-value
	PR	95% CI	
Age	1.011	0.976–1.046	0.263
Gender			
Female	0.837	0.679–1.032	0.096
Male	1		
Income			
No income	1.043	0.802–1.358	0.751
Up to US$ 602.80*	0.875	0.698–1.097	0.246
More than US$ 602.80	1		
Occupation			
Student and employed	1.00	0.624–1.611	0.993
Student	1.05	0.668–1.643	0.839
Employed	1.11	0.712–1.717	0.654
No study/no work	1		
Education level			
High school	0.808	0.540–1.210	0.302
Middle/junior high school	0.959	0.678–1.357	0.812
Elementary school	1		
Sexual orientation			
Bisexual	1.021	0.599–1.637	0.892
Homosexual	1.016	0.643–1.543	0.903
Heterosexual	1		
Depressive symptoms			
Not significant	0.819	0.610–1.099	0.182
Moderate	1.00	0.790–1.288	0.946
Clinically relevant	1		
Anxiety/fear symptoms			
Not significant	0.685	0.503–0.932	0.016
Moderate	0.821	0.630–1.069	0.142
Clinically relevant	1		
Traumatic distress			
Not significant	0.623	0.411–1.944	0.025
Moderate	0.916	0.757–1.110	0.372
Clinically relevant	1		
Had sex with an IDU			
Yes	1.185	0.665–2.111	0.565
No	1		
Had anal sex (insertive or receptive)			
Yes	1.284	1.064–1.548	0.009
No	1		
Ever exchanged sex for money			
Yes	1.275	0.969–1.679	0.083
No	1		
Had sex with MSM			
Yes	1.232	0.879–1.729	0.226
No	1		
Ever exchanged money for sex			
Yes	1.370	1.112–1.688	0.003
No	1		
Number of sex partners† (>2 *vs.* ≤2)			
Yes	1.221	0.982–1.518	0.072
No	1		
Used alcohol/drugs to make sex last longer			
Yes	1.448	1.224–1.718	<0.001
No	1		

95% CI = 95% confidence interval; IDU = intravenous drug user; MSM = men who have sex with men.
*US$ 1 = R$ 1.63 at the time of the study.
†In the 12 months prior to the interview.

and having sex under the influence of drugs/alcohol, thereby increasing the risk of sexually transmitted diseases, including HIV (12,27). Additionally, previous studies conducted in Latin American countries have found a higher prevalence of anal sex compared with other countries (28,29). Moreover, a U.S. study focusing on anal intercourse among substance-using club-goers found a higher prevalence of anal sex among Latinos compared with other ethnicities (12). The reasons for this difference may include a combination of cultural factors and traditional gender role norms, such as engaging in anal sex as reported by Latin women because of their male partner's requests or demands (30,31).

Studies have identified Brazil as having the highest prevalence of heterosexual anal sex participation (in addition to its historical position as having the second or third largest AIDS caseload worldwide) (32). It is clear that anal sex is more openly eroticized in Brazil than in most other countries; the fact that the ''butt'' represents a major erotic zone in Brazilian sexual culture most likely contributes to this finding (33–35). An ethnographic study showed that anal sex was linked to a cultural need to subjugate women using more than one type of intercourse. Findings from a survey conducted in Puerto Rican college students suggested that pleasing the partner, in addition to contraception and virginity preservation, were among the reasons for engaging in anal intercourse in the Latin American/Caribbean culture (36). Additionally, gender differences and an implicit power relationship have also been suggested as reasons for engaging in anal intercourse, as noted by Beck and Green; specifically, 47% of heterosexual men stated that they were the partners who decide whether to have anal sex, compared with 35% who regarded it as an equally negotiated decision. In contrast, 80% of the female students surveyed reported that the decision was always made by their partners (36).

A major finding of our study was the use of alcohol and drugs to make sex last longer. The combination of drugs and sex is a major public health concern because it may contribute to increases in the levels of sexually transmitted infections. According to a previous study, engagement in sex under the influence of alcohol or drugs has become, for many drug users, an integral part of their strategic approach to sex, possibly altering sexual decisions and increasing the probability of unsafe and regretted sex (37).

European countries have recorded high levels of alcohol and drug use combined with sex as well as increasing levels of sexually transmitted diseases (38–41). Other studies have also described the use of illicit drugs to enhance sexual performance and pleasure (42–44). A study conducted in drug-using sex workers in South Africa revealed that cocaine, ecstasy, heroin, and methaqualone were used to enhance the sexual experience and prolong sex sessions (45). The use of drugs before and during sex tends to be associated with personality characteristics such as impulsivity and sensation-seeking (46,47), and a number of authors have referred to sensation-seeking or altered judgment as an explanation for the frequent association between high-risk sexual behaviors and drug use (48–50). It is important to emphasize that both sexual arousal and sexual functioning can be affected by drug use. However, the exact mechanisms underlying this relationship appear to depend on the particular substance ingested, the dosage consumed, and individual perceptions or expectations regarding drug effects (51,52).

In the present study, no association was found between unprotected sex in the 12 months preceding the interview and the demographic variables gender, income, education, and occupation, which is consistent with a previous study

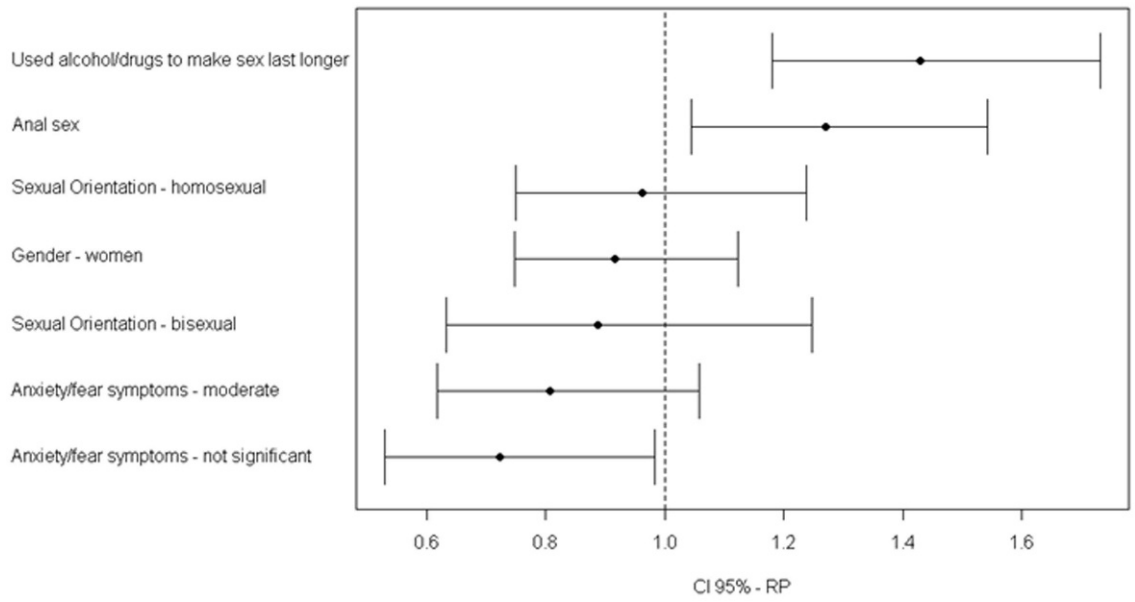

Figure 1 - Multivariate analysis shows that anal sex (PR = 1.27; 95% CI: 1.044–1.543; $p = 0.017$), use of alcohol/drugs to make sex last longer (PR = 1.430; 95% CI: 1.181–1.732; $p < 0.001$), and anxiety/fear symptoms (PR = 0.724; 95% CI: 0.532–0.983; $p = 0.039$) are associated with unprotected sex.

conducted on ecstasy users in Brazil (21). In addition, in our sample, participants with non-significant anxiety/fear symptoms showed a lower prevalence of unprotected sex compared with participants with clinically relevant anxiety. This finding is in accordance with previous studies that have suggested an association between anxiety and engagement in risk behaviors. According to the literature, the higher the severity of anxiety symptoms is, the higher the risk of involvement in risk behaviors (e.g., unsafe sex) and novelty seeking, usually as a result of impulsive decision-making (53,54).

The sample assessed cannot be considered representative of club drug users in Brazil, as individuals were selected using convenience sampling. Nonetheless, the consistency between our findings and those reported in the relevant literature suggests at least a similarity between our sample and other populations of club drug users. In this sense, particular attention should be paid to relevant aspects of South American culture, such as the higher prevalence of engagement in anal sex compared with other cultures and the observation that anal intercourse is a predictor of unprotected sex.

Finally, this was a self-report study, with the inherent advantage of performing data collection and analysis within a short period of time, which most likely explains why this methodology is still the first choice for most studies of this nature. Conversely, the self-report methodology also has important disadvantages, such as recall bias and the potential predetermination of the respondent to change or hide actual facts. Although a reliance solely on self-report measures of behavior is controversial, a variety of controlled studies have documented that, in a nonthreatening environment, when questioned about drug use and sexual activities, drug users usually provide reliable information and are truthful to the best of their recollection (55,56). Therefore, we believe that the guarantee of confidentiality to our participants and the use of a specifically trained staff have helped mitigate the potential deficiencies in the self-report methodology.

Longitudinal cohort studies with larger samples of ecstasy users are warranted. In the meantime, we believe that our preliminary findings will contribute to a better understanding of the factors associated with sexual risk behaviors and will provide guidance for future studies.

An improved understanding of the factors associated with sexual risk behaviors has important implications for the sexual health of young adults, especially drug users. Therefore, intervention strategies aimed at reducing sexual risk behaviors should take the specific features of drug users into consideration and should include the development of safer (anal and vaginal) sex negotiation skills.

Behavioral interventions are known to reduce unprotected sex practices, and our results indicate that preventive measures aimed at this population can be successful and should be supported. Making condoms available to the community and increasing the efficacy of self-management behaviors could contribute to the promotion of effective personal strategies for reducing risk behaviors (e.g., reducing unprotected anal sex, having oral sex rather than anal sex, reducing the number of partners, avoiding serodiscordant partners, or reducing anal sex even with condom use). Future studies should be conducted to further clarify which messages are most effective in promoting these behaviors as well as to identify the methods by which and settings in which such messages can be most effectively delivered. Because most studies have been conducted in white men from the U.S. and Europe, more evaluations of interventions are needed in African American and Hispanic populations, as well as in developing countries such as Brazil.

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AUTHOR CONTRIBUTIONS

All authors participated substantially in this work and take public responsibility for its content. Pechansky F, Surratt H, Kurtz S, and Remy L conceived the project. Remy L conducted the literature review and, together with Guimarães L and Von Diemen L, defined the data analysis plan. Remy L and the individuals included in the acknowledgement section collected the data. Remy L and Guimarães L interpreted the results. Remy L, Narvaez J, and Sordi A wrote the manuscript, and the other authors substantially edited the manuscript. All authors have read and approved the final manuscript.

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